

CLAIMS

WHAT IS CLAIMED IS:

1. A fuel fill system comprising:
an outer funnel formed from a thermoplastic material;
a component formed from a thermoplastic material and in fluid communication with the outer funnel via a joint, wherein the outer funnel is welded to the component to form the joint, the component being selected from at least one of a flange, a tube, and a vapor recirculation fitting.
2. The fuel fill system of claim 1, wherein the weld is formed by at least one of: spin welding, hot plate welding, laser welding, vibration welding, and ultrasonic welding.
3. The fuel fill system of claim 1, wherein the component is a tube, and the fuel fill system further comprises:
a flange formed from a thermoplastic material and in fluid communication with the outer funnel via a second joint, wherein the outer funnel is welded to the flange to form the second joint.
4. The fuel fill system of claim 3, further comprising:
a vapor recirculation fitting formed from a thermoplastic material and in fluid communication with the outer funnel via a third joint, wherein the outer funnel is welded to the vapor recirculation fitting to form the third joint.
5. The fuel fill system of claim 5, wherein the weld is formed by at least one of: spin welding, hot plate welding, laser welding, vibration welding, and ultrasonic welding.
6. The fuel fill system of claim 1, further comprising:
an inner funnel disposed within the outer funnel and secured within the outer funnel by the flange, the flange being welded to the outer funnel.

7. The fuel fill system of claim 6, further comprising:
a means for preventing axial rotation of the inner funnel within the outer funnel.
8. The fuel fill system of claim 7, wherein the means for preventing axial rotation includes a protrusion extending from one of the inner funnel and the outer funnel, the protrusion being received in a recess disposed in the other of the inner funnel and the outer funnel.
9. The fuel fill system of claim 1, further comprising:
a removable cap disposed on the flange for sealing the fuel fill system.
10. The fuel fill system of claim 1, wherein the outer funnel includes a cylindrical protrusion extending therefrom, the weld being formed on an outer circumference of the cylindrical protrusion.
11. The fuel fill system of claim 1, wherein the outer funnel includes a cylindrical protrusion extending therefrom, the weld being formed on an inner circumference of the cylindrical protrusion.
12. The fuel fill system of claim 1, wherein the outer funnel includes an annular recess disposed therein, the annular recess being formed by opposing surfaces, and the weld being formed on the opposing surfaces.
13. The fuel fill system of claim 1, wherein the component includes a cylindrical protrusion extending therefrom, the weld being formed on an outer circumference of the cylindrical protrusion.
14. The fuel fill system of claim 1, wherein the component includes a cylindrical protrusion extending therefrom, the weld being formed on an inner circumference of the cylindrical protrusion.
15. The fuel fill system of claim 1, wherein the component includes an annular recess disposed therein, the annular recess being formed by opposing surfaces, and the weld being formed on the opposing surfaces.

16. The fuel fill system of claim 1, wherein the outer funnel includes an alignment feature disposed thereon, the alignment feature cooperating with an alignment feature on the component to ensure proper alignment of the component relative to the outer funnel.

17. The fuel fill system of claim 1, wherein the plastic outer funnel is formed from an electrically conductive thermoplastic material.

18. A method of assembling a fuel fill system comprising:

a providing a thermoplastic outer funnel;

welding a thermoplastic component to the outer funnel to provide a joint between the outer funnel and the component, the component being selected from at least one of a flange, a tube, and a vapor recirculation fitting.

19. The method of claim 18, wherein the welding includes at least one of: spin welding, hot plate welding, laser welding, vibration welding, and ultrasonic welding.

20. The method of claim 18, wherein the component is a tube, and the method further comprises:

welding a flange formed from a thermoplastic material to the outer funnel to provide a joint between the outer funnel and the flange.

21. The method of claim 20, further comprising:

welding a vapor recirculation fitting formed from a thermoplastic material to the outer funnel to provide a joint between the outer funnel and the vapor recirculation fitting.

22. The method of claim 21, wherein each welding includes at least one of: spin welding, hot plate welding, laser welding, vibration welding, and ultrasonic welding.

23. The method of claim 18, further comprising:

inserting an inner funnel within the outer funnel; and

welding the flange to the outer funnel to secure the inner funnel within the outer funnel.

24. The method of claim 23, further comprising:
a means for preventing axial rotation of the inner funnel within the outer funnel.

25. The method of claim 24, wherein the means for preventing axial rotation includes a protrusion extending from one of the inner funnel and the outer funnel, the protrusion being received in a recess disposed in the other of the inner funnel and the outer funnel.

26. The method of claim 18, further comprising:
inserting a removable cap on the flange for sealing the fuel fill system.

27. The method of claim 18, wherein the plastic outer funnel is formed from an electrically conductive thermoplastic material.

28. The method of claim 18, wherein the welding includes:
generating heat by relative motion of between the outer funnel and the component.

29. The method of claim 18, wherein the welding includes:
applying an external source of heat to surfaces to be welded on the outer funnel and the component.